

ABSTRACT OF THE DISCLOSURE

2 A frequency synchronizer system is based on the maximum likelihood criterion from
estimation theory and that can achieve both frequency acquisition and frequency tracking
4 without requiring knowledge at the receiver of the carrier's phase angle, baud timing, or a
preamble consisting of known signal symbols. The synchronizer includes a processor for
6 executing the following sequence of operations: a) initializing an estimated frequency correction
factor; b) determining a corrected frequency offset value from a first product of a sample signal
8 and the estimated frequency correction factor; c) filtering a first sample of the corrected
frequency offset value to obtain a filtered corrected frequency offset value; d) imparting a delay
10 to a second sample of the corrected frequency offset value to obtain a delayed corrected
frequency offset value; e) determining a conjugate product value from a second product of the
12 filtered corrected frequency offset value and a conjugate of the filtered corrected frequency
offset value; f) determining a delay conjugate value from a third product of the delayed corrected
14 frequency offset value and the conjugate product value; g) determining an error signal from the
delay conjugate value; h) determining a frequency offset value from the error signal; and i)
16 determining an updated value of the estimated frequency correction factor from the frequency
offset value.